Ky. Climate Action Plan Overview

Presentation to CRERES Board of Directors

Capital Annex

February 21, 2012

Ky. Climate Action Plan

- The Council was convened in 2010 to:
  - Identify potential strategies to reduce greenhouse gas emission in KY; and
  - Educate many constituent groups of the means to reduce GHGs.
- Used a stakeholder process

Ky. Climate Action Plan Process

- Energy Strategy provided the foundation
- 27-member council appointed
- Technical Working Groups assigned
- GHG inventory and forecast document prepared

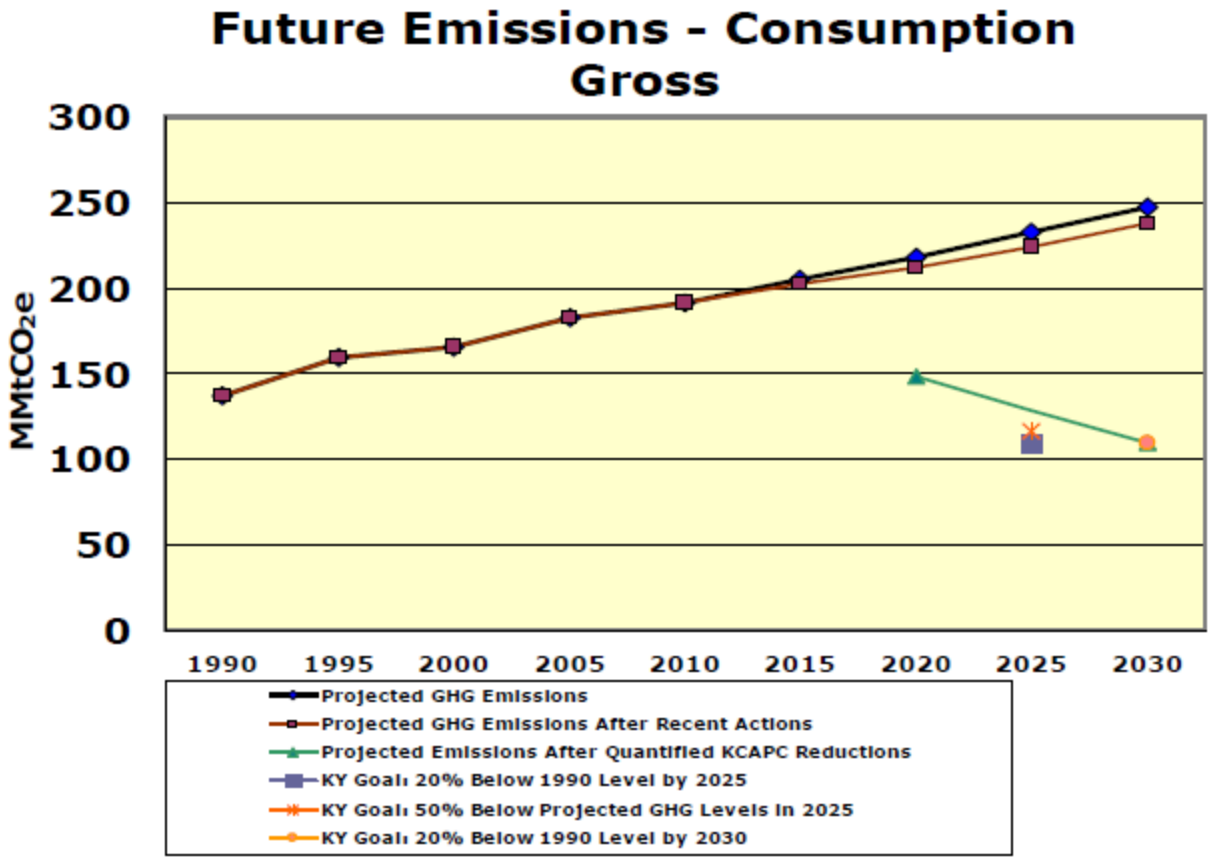
Ky. Climate Action Plan Process

- Council members approved 46 policy options from a list of 380.
- Consulting firm quantified 33 policy options in terms of $/CO2e reduced
- A final report states the quantified results and details issues, pros, and cons of each option.

Goals and Outcomes

- Achieve a 20% reduction of GHGs below 1990 levels by 2030
  - 1990 emissions = 136.7 million metric tons of carbon dioxide equivalent [MMtCO2e]
  - 2030 Goal = 109.4 MMtCO2e
- The policy recommendations analyzed would reduce GHGs by about
  - 63.7 MMtCO2e in 2020;
  - 128.3 MMtCO2e in 2030, and
  - 1,316 MMtCO2e cumulatively over the 2011–2030 period
- The policy recommendations are projected to have a net cost of about $11.6 billion during the period 2011–2030.

Actual and Forecasted GHGs



$MMtCO_2e$ = million metric tons of carbon dioxide equivalent; GHG = greenhouse gas; KCAPC = Kentucky Climate Action Planning Council.

GHG Reduction Summary by TWG

Sector	GHG Reductions ($MMtCO_2e$)			Net Present Value 2011–2030 (Million $)	Cost-Effective-ness ($/tCO_2e$)
	2020	2030	Total 2011–2030		
Residential, Commercial, and Industrial (RCI)	19.1	38.3	408.2	$1,220	$3
Energy Supply (ES)	37.4	75.8	755.9	$17,911	$24
Transportation and Land Use (TLU)	2.8	6.3	62.4	–$7,877	–$126
Agriculture, Forestry, and Waste Management (AFW)	4.4	7.9	89.7	$308	$3.4
Cross-Cutting Issues (CCI)	Non-quantified, enabling options				
TOTAL (includes all adjustments for overlaps)	**63.7**	**128.3**	**1,316.2**	**$11,562**	**$8.8**

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Agriculture, Forestry & Waste Policy Options
CO2e Reduction and Cost

- AFW-2 Expanded Use of Biomass Feedstocks for Electricity, Heat, and Steam Production
- AFW-3a On-Farm Energy Production
- AFW-4 In-State Liquid/Gaseous Biofuels Production
  - (AFW-2, 3a, and 4 recommend increasing the productivity and conversion of crops, residues, and other farm resources to meet the ES, TLU, and RCI needs; the GHG reductions and costs/cost savings were accounted for in the sector where the biomass is utilized.)
- AFW-6 Increase Productivity of Abandoned, Underutilized, and Reclaimed Lands
  - 5.8 million tons of CO2e removed in 2030
  - $1 per ton of CO2e removed
- AFW-9 Landfill Methane Energy Programs
  - 2.4 million tons of CO2e removed in 2030
  - $1 per ton of CO2e removed

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Agriculture, Forestry & Waste Policy Options
CO2e Reduction and Cost

- AFW-5b Soil Carbon Management – Winter Cover Crops
  - 1.9 million tons of CO2e removed in 2030
  - $7 per ton of CO2e removed
- AFW-8 Advanced MSW Reuse, Recycling, and Organic Waste Management Programs
  - 1.3 million tons of CO2e removed in 2030
  - $10 per ton of CO2e removed
- AFW-7b Reforestation, Afforestation, and Restoration of Mined Lands and Other Non-forested Lands—Other Lands
  - 1.0 million tons of CO2e removed in 2030
  - $4 per ton of CO2e removed
- AFW-5a Soil Carbon Management – No-Till/Conservation Tillage
  - .74million tons of CO2e removed in 2030
  - $1 per ton of CO2e removed

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Agriculture, Forestry & Waste Policy Options

CO2e Reduction and Cost

- AFW-3b On-Farm Energy Efficiency Improvements
  - .45 million tons of CO2e removed in 2030
  - -$21 per ton of CO2e removed
- AFW-7a Reforestation, Afforestation, and Restoration of Mined Lands and Other Non-forested Lands—Mined Lands
  - .09 million tons of CO2e removed in 2030
  - -$120 per ton of CO2e removed
- AFW-1 Forestry Management for Carbon Sequestration
  - .07 million tons of CO2e removed in 2030
  - $20.3 per ton of CO2e removed

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Energy Supply Policy Options

CO2e Reduction and Cost

- ES-7 Renewable Energy Incentives and Barrier Removal
  - 22.2 million tons of CO2e removed in 2030
  - $20.6 per ton of CO2e removed
  - (Assumes 75% of renewable electricity from biomass)
- ES-6 Nuclear Energy Capacity
  - 19.5 million tons of CO2e removed in 2030
  - $21.3 per ton of CO2e removed
  - (Assumes 2000 MW of Nuclear Power installed by 2025)
- ES-11 Smart Grid and Transmission Efficiency
  - 13.5 million tons of CO2e removed in 2030
  - $26.6 per ton of CO2e removed
  - (Assumes 50% smart meter deployment by 2020 and 100% by 2030)

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Energy Supply Policy Options

CO2e Reduction and Cost

- ES-1 Biomass Co-firing and Power Plant Efficiency
  - 6.6 million tons of CO2e removed in 2030
  - $14.1 per ton of CO2e removed
- ES-5 Pricing Strategies for Efficiencies and Renewables
  - 5.2 million tons of CO2e removed in 2030
  - $27.5 per ton of CO2e removed
  - (Quantification assumes a feed-in tariff only)
- ES-3 Advanced Fossil fuel technologies
  - 2.3 million tons of CO2e removed in 2030
  - $33.2 per ton of CO2e removed
  - (Quantified 800 MW of Advanced Supercritical Coal with CCS)

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Other Energy Supply Policy Options

- ES-4 Carbon Capture, Storage, and Reuse R&D
- ES-8 Research, Development and Demonstration of Renewable, Efficiency, and Storage Projects
- ES-9 Policies to Support Wind Energy
- ES-10 Shale Gas Development, Natural Gas Transportation Infrastructure, and Natural Gas Liquids
- ES-12 Coal-to-Liquids

Residential, Commercial, and Industrial Sectors

Policy Recommendations

- **Improve Building Codes for EE; Improve Code Training and Enforcement**
- **Provide Incentives for "Beyond-Code" EE in All Buildings and Systems**
- **Expand Utility DSM Programs for Electricity**
- **Implement Comprehensive Education, Outreach, and Marketing**
- **Financing Programs and Incentives for EE and CHP; PBF, Revolving Loans**
- **Financing Programs, Incentives for Renewables, Low-Carbon Sources**
- **Government Lead by Example (GLE) in State and Local Govt. Buildings**
- **Training and Education for Builders, Contractors, and Building Operators**
- **Building Commissioning and Recommissioning, Including Energy Tracking and Benchmarking, and Implement a Building Energy Labeling Program**
- **Implement Advanced Metering Technologies and Associated Policies for Greater Load Management, Customer Control, Awareness, Price Signaling (Moved to ES-11)**

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Residential, Commercial, and Industrial Sectors

Potential Benefits

- **GHG reduction 38 MMtCO_2e annually by 2030**
- **GHG cumulative savings 400 MMtCO_2e from 2011 to 2030**
- **Overall cost effectiveness estimated at \$3/tCO_2e**
- **Some measures had cost <u>savings</u> of \$20 to \$27/tCO_2e**

Transportation and Land Use Sectors

- Policy Recommendations
  - Bicycle and Pedestrian Comprehensive Plan
  - Livability and Connectivity
  - Transportation System Management
  - Transit Management and Infrastructure
  - Education and Outreach
  - Parking Management and Ride Sharing
  - Strategies for Freight Movement
  - Promotion of Locally Produced Goods and Services
  - Promotion of Alternative Transportation Fuels
  - Promotion of Clean Vehicles

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Transportation and Land Use Sectors

- Potential Benefits
  - GHG emissions reduced 62.41 MMtCO_2e between 2011 – 2030
  - Energy savings of 7,980 million gallons of fuel between 2011 – 2030
  - Net savings and economic benefit to the Commonwealth in the amount of $126 per t$CO_2$e reduced
  - Creation of more livable, healthier communities, with direct health and cost savings to the driving public and businesses

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Cross-Cutting Issues

- CCI-1 GHG inventories, forecasts, reporting and registry
- CCI-2 Education and Outreach
- CCI-3 Adaptation and Vulnerability
- CCI-4 Emission reduction, energy intensity and energy efficiency goals and standards
- CCI-5 State and local governments to lead by example
- CCI-6 Support local government efforts
- CCI-7 Financial policies
- CCI-8 Impact analysis of Federal GHG constraints

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Ky. Climate Action Plan Overview

Final Report Highlights

Presentation to CRERES Board

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